III. REMARKS

In the Office Action, claims 26-50 and 58-61 were rejected under 35 U.S.C. 103 as being unpatentable over Dent (US 2003/0060195) in view of Phillips (US 6072994) for reasons set forth in the Action. Claims 51-55 were rejected under 35 U.S.C. 103 as being unpatentable over Dent in view of Phillips and further in view of Ramesh (US 5943324). Claims 56-57 were rejected under 35 U.S.C. 103 as being unpatentable over Dent for reasons set forth in Points 10-11 of the Action.

With respect to the rejections under 35 U.S.C. 103, the following argument is presented to distinguish the claimed subject matter from the teachings of the cited art, considered individually and in combination, thereby to overcome the rejections and to show the presence of allowable subject matter in the claims.

With respect to the rejections of the independent claims 26 and 40 over the combined teachings of Dent and Phillips, the examiner notes (Point 3 of the Action) that Dent does not disclose providing a further signal to RF circuitry operable at an intermediate frequency common to each mode of operation. The examiner then cites Phillips (col. 21 at line 66 to col. 22 at line 16, Point 3 of the Office Action) to disclose supplying a further signal to RF circuitry operable at an intermediate frequency common to an analog mode and to a digital mode of operation. This is believed to be a misreading of "common to each mode of operation". In Phillips, the digital signal processing operates in conjunction with the reception and transmission of signals modulated onto carriers communicated via analog circuitry to and from the digital signal processing circuitry. However, in Phillips, there is analog circuitry employed for the reception of incoming signals and separate analog circuitry employed for the transmission of outgoing signals, wherein the reception analog circuitry and the transmission analog circuitry are operated separately and independently of each other. Thus, in Phillips, there is no analog circuitry that is common to both a transmission mode and to a reception mode of operation of the Phillips system.

Furthermore, in Phillips, there is no analog circuitry that is common to two different reception modes as is demonstrated by tracing of the signals paths in Fig. 6A through the filter bank 508, which is described in col. 30 at line 19 as being a switchable bandpass filter bank that includes several bandpass filters. In other words, different IF circuit paths are provided for communication of IF signals at different frequencies. By way of contrast with the teachings of the present specification and drawings, present Figs. 6-9 show various embodiments of the present invention wherein, in each of the embodiments, there is a showing of a sharing of IF signal reception channels operable for reception of signals received at the antennas in different frequency bands.

By way of example, in present Fig. 6, line 71 carries signals received via the antennas 307a and 306a to be mixed with a common reference at element 608. The antennas 307a and 306a deal with signals located in different spectral bands. Also, by way of example, in present Fig. 6, line 116 carries signals transmitted via the antennas 307b and 306b after having been mixed with a common reference at element 610. The antennas 307b and 306b deal with signals located in different spectral bands. A similar analysis applies to each of Figs. 7, 8 and 9 to show the use of common signal paths and signal processing elements for signals associated with different modes of operation.

With respect to signals transmitted by Phillips, as shown in his circuitry of Fig. 7A, an outgoing signal is switched among several signal channels, each with its own bandpass filter, depending on the frequency imparted by the circuitry to the carrier of the transmitted signal. Thus, there is no sharing in Phillips of signal circuit paths for signals transmitted in different modes (different carrier frequencies). In contrast with the present circuitry of Figs 6-9, the present circuitry shares IF filters for producing transmission carriers at different frequencies.

Further, in the above-noted cited passage of Phillips, reference is made by the examiner to a common programmable transmit module 204 of Fig. 3 with details disclosed in

Figs. 7A and 7B (see col. 7 figure description). The module 204 performs digital signal processing upon signals outputted from an antenna (the antenna system is shown in Fig. 3). The analog circuitry of the module 204 is shown for transmission (Figs. 7A and 7B) and provides for adjustment of a carrier frequency upon which a signal is modulated, wherein the stages of the carrier frequency take on values from IF (intermediate frequency) to RF (radio frequency), and wherein the analog circuitry operates in the manner of a frequency synthesizer via a sequence of switches for combining the frequencies outputted by different oscillators. In an analogous fashion, Fig. 3 shows a module 106 that is also connected to the antenna system, and performs digital signal processing upon signals received from the antenna. The module 106 also has analog circuitry shown for reception (Figs. 6A and 6B), and provides for adjustment of a carrier frequency upon which a signal is modulated, wherein the stages of the carrier frequency take on values from RF (radio frequency) to IF (intermediate frequency), and wherein the analog circuitry operates in the manner of a frequency synthesizer via a sequence of switches for combining the frequencies outputted by different oscillators.

This analysis of Phillips supports the foregoing observation that, in Phillips, there is no analog circuitry that is common to both a transmission mode and to a reception mode of operation of the Phillips system. The disclosure of Phillips can be viewed as presenting separate analog and digital submodules isolated from each other, which negates a suggestion of analog signal-processing stages operated in common. In contrast, with reference to the present Figs. 6-9, in the embodiments represented by these respective figures, common analog circuitry is used in the processing of both transmission and reception modes of operation, even where operability in different frequency bands of transmission and different frequency bands of reception is provided.

The following further analysis of the Phillips disclosure is provided. The programmable common receive module 106 which is illustrated in more detail in FIG. 6A (analog submodule 500) and FIG. 6B (digital submodule 600) can service a wide range of CNI

functions in approximately the 1.5 MHZ to 2000 MHz region with an option to extend this region above to higher or lower down to frequencies using block conversion.

An important feature of the architecture of the receive module 106 is the partitioning of the system into analog 500 and digital 600 submodules that preferably correspond to different circuit boards with separate power/ground sources, and that allows the noise producing digital circuits to be adequately isolated and shielded from the analog side components. For purposes such as fabrication, testing, etc., the analog and digital submodules in the same common receive module 106 (or in the same common transmit module 104) can be contained on the same circuit board but with analog and digital portions that are electrically isolated from each other, or each submodule can consist of multiple physically separate circuit boards that are properly connected. Moreover, the term "circuit board" is a general term that can also include other forms of containment such as "chips," application-specific integrated circuits [ASICs], monolithic hybrid packages [MHPs], etc. Also, major portions of each submodule can be combined in higher levels of integration. For example, many of the individual elements in digital submodule 600 (or in digital submodule 700) can be combined into a single element or "chip," or even the entire digital circuitry in each of these submodules can be consolidated into a single element for possible savings in size, cost and power dissipation. Regardless of the specific mechanical configuration, the analog and digital portions of the digital submodules 600 and 700 in the following descriptions are electrically isolated from each other in order to prevent the relatively noisy digital circuits from creating unwanted extraneous signals within the sensitive analog circuits.

The analog receiver submodule 500 (see FIG. 6A) typically receives an RF signal from the AIU 308. The submodule 500 includes a frequency synthesizer 502 that produces internal oscillator reference signals from an input reference oscillator signal, which internal reference signals are used for generating a tunable local oscillator signal in a tunable local oscillator unit 504, and for generating fixed local oscillator signals produced by a fixed local oscillator unit 505. The tuned local oscillator signal is provided

to a first analog mixer 506 that typically provides the first frequency translation of the RF signal. The produced analog intermediate frequency signal is provided to a switchable bandpass filter bank 508 that includes several bandpass filters. Four such filters usually provide sufficient rejection, in the first IF stage, of the RF interference that is received along with the signal of interest for a wide range of CNI applications. In addition to interference rejection, these filters reject local oscillator leakage through the mixer 506 as well as suppress images, spurious mixer products, harmonics and other unwanted signals produced by received signals (including interference) reacting with the nonlinearties of the components preceding the mixer in the receive path.

The filtered intermediate signal can be routed through a switch 510 to a second mixer 512 that produces a further intermediate frequency signal. This second analog intermediate frequency signal is provided to the primary wideband anti-aliasing circuit 514 that is essentially a fixed bandwidth bandpass filter with a bandpass range of approximately 8 MHz and a center frequency of 30 MHz.

The foregoing discussion of the receiving analog circuitry, and a corresponding discussion of the transmission analog circuitry (which can be understood from a study of Phillips) show that the Phillips transmission analog circuitry and the reception analog circuitry are operated separately and independently to negate a suggestion of a analog circuitry operable at an intermediate frequency common to both transmission and reception modes of operation. Also, as noted above, with respect to the present specification and drawings, there is a sharing of IF analog circuitry (as shown in present Figs. 6-9) among transmission modes that differ in carrier frequency, and a sharing of IF analog circuitry among reception modes that differ in carrier frequency, as well as a sharing or IF analog circuitry among transmission and reception modes of operation. However, in Phillips, separate IF analog signal paths are provided for transmission modes operating at different carrier frequencies and for reception modes operating at different carrier frequencies. The failure of Phillips to show a feature of the claimed

subject matter indicates that there would be no motivation to combine the teachings of Phillips with Dent.

To emphasize the foregoing distinctions between the presently claimed subject matter and the teachings of the cited art, the independent claims 26 and 40 are amended to show the different carrier frequencies of the signals in the different modes. In addition, the amendment includes further circuitry, finding support in the mixers of present Figs. 6-9, which provide the operability at an intermediate frequency common to each mode of operation. The amended claims, as well as their dependent claims, now are clearly distinguishable over the teachings of Phillips considered alone and in combination with Dent. Accordingly, this amendment and argument are believed to overcome the rejections under 35 U.S.C. 103 to provide for allowable subject matter in the claims.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record, and are in proper form for allowance. Accordingly, favorable reconsideration and allowance is respectfully requested. Should any unresolved issues remain, the Examiner is invited to call Applicants' attorney at the telephone number indicated below.

The Commissioner is hereby authorized to charge $120 for payment of a one-month extension of time and for any other fees associated with this communication or credit any over payment to Deposit Account No. 16-1350.

Respectfully submitted,

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